Formation PHPUnit

Romain Bohdanowicz
Twitter : @bioub
http://www.formation.tech/

Sommaire

- Introduction
- PHPUnit
- Assertions
- Types de tests
- Doubles
- Zend Framework 2

formation.tech

Introduction

Présentation

- ## Romain Bohdanowicz
  Ingénieur EFREI 2008, spécialité en Ingénierie Logicielle

- ## Expérience
  Formateur/Développeur Freelance depuis 2006
  Plus de 5000 heures de formation

- ## Langages
  Expert : HTML / CSS / JavaScript / PHP / Java
  Notions : C / C++ / Objective-C / C# / Python / Bash / Batch

- ## Certifications
  PHP 5 / PHP 5.3 / PHP 5.5 / Zend Framework 1

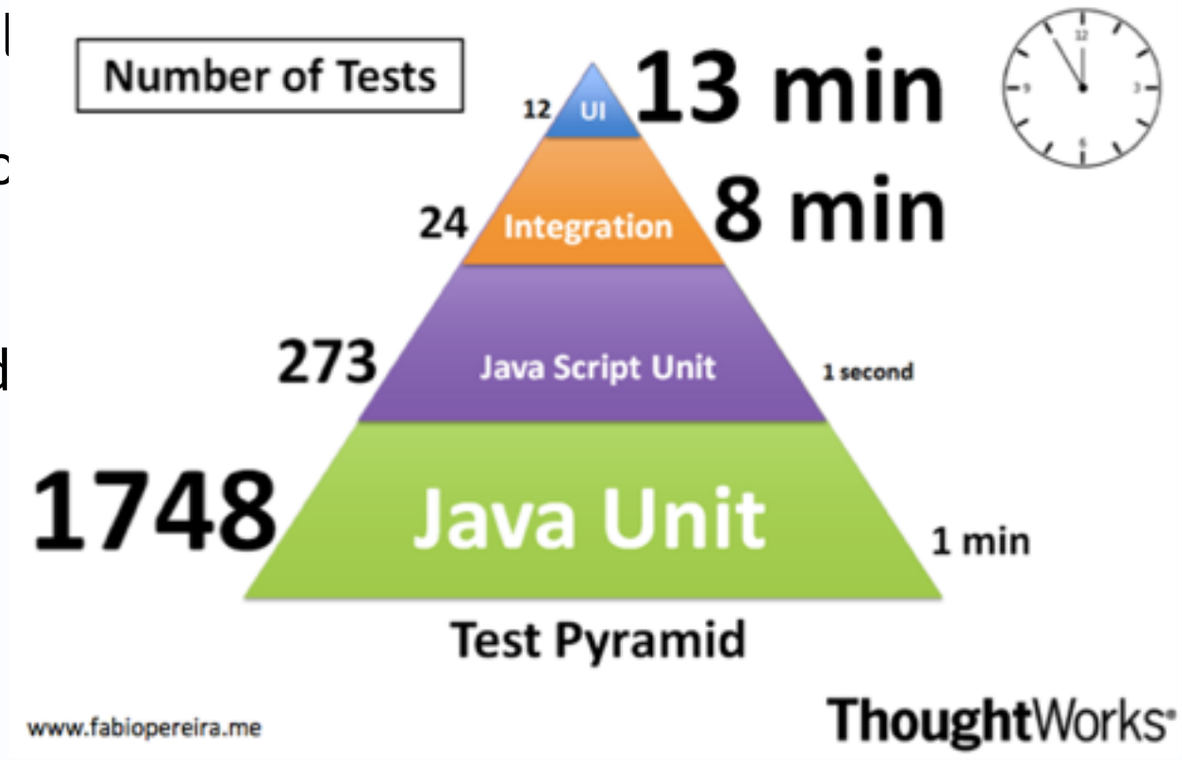
- ## Et vous ?
  Langages ? Expérience ? Utilité de cette formation ?

Tests automatisés

- Vérification manuelle
  - Ecrire une recette de tests et demander à une personne de la rejouer à des étapes clés (nouvelle version)
  - Ecrire le test sous la forme de code, et vérifier visuellement que les résultats attendus soit les bons
- Tests automatisés
  - Le test est codé, la vérification se fait dans un rapport
- Historique
  - sUnit en 1994 (SmallTalk), JUnit en 1997 (Java)
  - Les frameworks s’inspirant de jUnit sont catégorisés xUnit (PHPUnit, CUnit…)

Pyramide des Tests

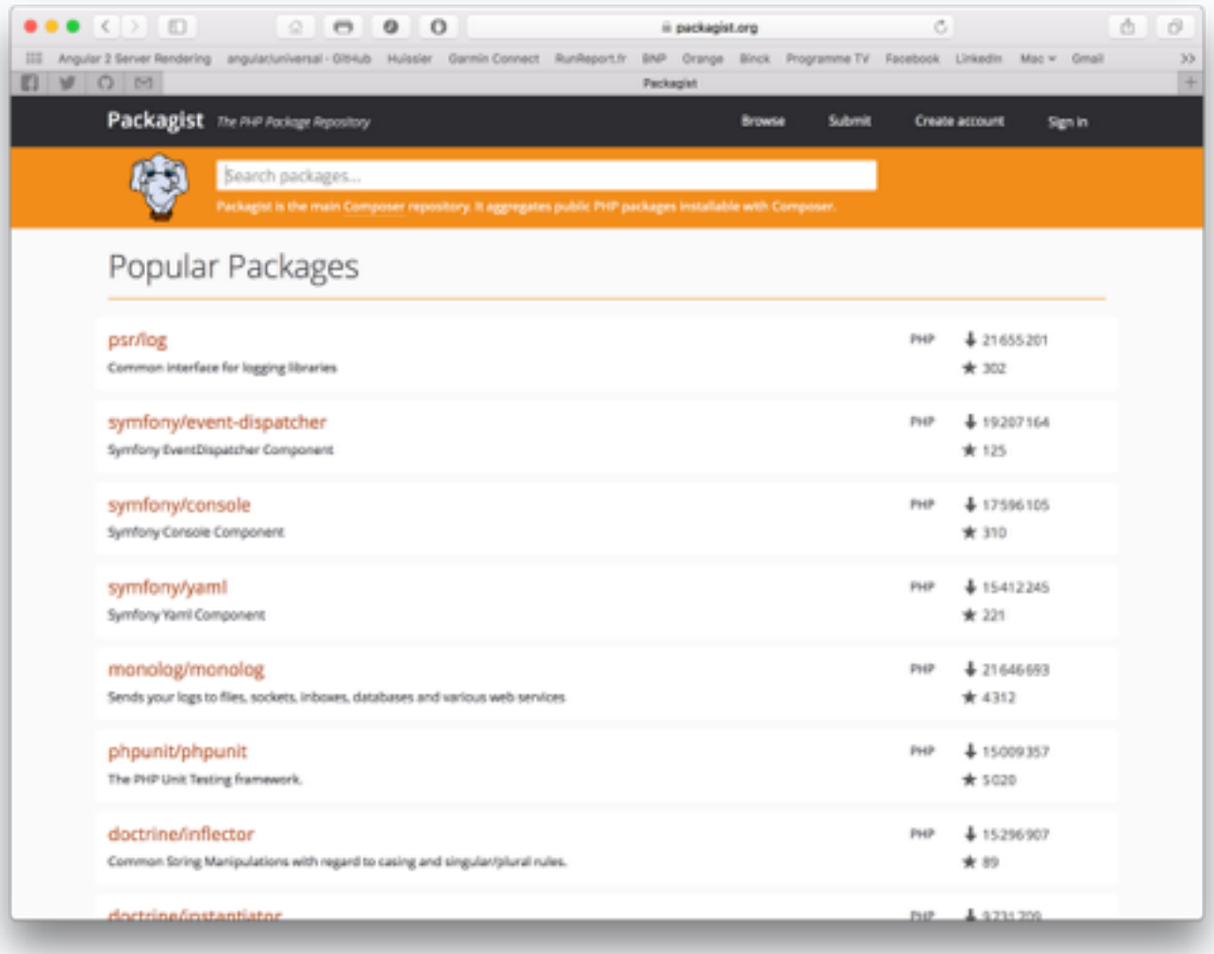
- Types de tests
  - **Unitaire** : tests des méthodes d'une cla
  - **Intégration** : teste l'intégration entre pl
  - **Fonctionnels** : teste l'application du pc web)
  - **End-to-End (E2E)** : teste l'application d CSS…)



PHPUnit

PHPUnit - Introduction

- Créé en 2001 par Sebastian Bergmann
- Framework de tests de référence en PHP
  Utilisé, même étendu par Symfony et Zend Framework
- Documentation
  https://phpunit.de/documentation.html
- Open Source
  Licence BSD Modifiée
- Concurrents :
  atoum (FR), Behat (BDD), SimpleTest



PHPUnit - Installation globale

- PHAR
  - Dernière Version
    https://phar.phpunit.de/phpunit.phar
  - Version spécifique
    https://phar.phpunit.de/phpunit-X.Y.Z.phar

- Composer
  - Dernière Version
    `composer global require phpunit/phpunit`
  - Version spécifique
    `composer global require phpunit/phpunit:5.0.*`
  - Penser à ajouter le répertoire bin global au PATH, sur UNIX :
    `~/.composer/vendor/bin`

PHPUnit - Installation locale

- Composer
  - Dernière Version
    `composer require phpunit/phpunit --dev`
  - Version spécifique
    `composer require phpunit/phpunit:5.0.* --dev`
  - Ou en éditant directement le fichier composer.json puis composer update

```
{
    "require-dev" : {
        "phpunit/phpunit": "5.1.*"
    }
}
```

  - Exécution depuis la racine du projet :
    `./vendor/bin/phpunit`

PHPUnit - Structure d’un test

- Conventions
  - Un test PHPUnit est une méthode dont le nom commence par test : testMaFonction()
  - Cette méthode se trouve dans une classe dont le nom se termine par Test et qui hérite de \PHPUnit_Framework_TestCase
- Bonnes pratiques
  - Ne pas hésiter à être le plus verbeux possible dans le nom des méthodes
  - L’arborescence du répertoire test correspond au répertoire src (ex : src/MonNamespace/MaClasse.php -> src/MonNamespaceTest/MaClasseTest.php)

PHPUnit - Exemple

```php
<?php

namespace FormationTechTest\Entity;

use FormationTech\Entity\CompteBancaire;

class CompteBancaireTest extends \PHPUnit_Framework_TestCase
{
    public function testCrediter()
    {
        $compte = new CompteBancaire(0);
        $compte->crediter(1000);
        $this->assertEquals(1000, $compte->getSolde());

        $compte->crediter(500);
        $this->assertEquals(1500, $compte->getSolde());
    }
}
```

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit tests/Entity/CompteBancaireTest.php --colors
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

.                                                                   1 / 1 (100%)

Time: 39 ms, Memory: 1.50Mb

OK (1 test, 2 assertions)
```

PHPUnit - Appels automatiques

- PHPUnit peut appeler des méthodes avant et après chaque test
  - setUp
  - tearDown
- Avant ou après chaque classe
  - setUpBeforeClass
  - tearDownAfterClass

PHPUnit - Ligne de commande

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit -h
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

Usage: phpunit [options] UnitTest [UnitTest.php]
       phpunit [options] <directory>

Code Coverage Options:

  --coverage-clover <file>  Generate code coverage report in Clover XML format.
  --coverage-crap4j <file>  Generate code coverage report in Crap4J XML format.
  --coverage-html <dir>     Generate code coverage report in HTML format.
  --coverage-php <file>     Export PHP_CodeCoverage object to file.
  --coverage-text=<file>    Generate code coverage report in text format.
                            Default: Standard output.
  --coverage-xml <dir>      Generate code coverage report in PHPUnit XML format.
  --whitelist <dir>         Whitelist <dir> for code coverage analysis.

Logging Options:

  --log-junit <file>        Log test execution in JUnit XML format to file.
  --log-tap <file>          Log test execution in TAP format to file.
  --log-teamcity <file>     Log test execution in TeamCity format to file.
  --log-json <file>         Log test execution in JSON format.
  --testdox-html <file>     Write agile documentation in HTML format to file.
  --testdox-text <file>     Write agile documentation in Text format to file.
  --reverse-list            Print defects in reverse order
```

PHPUnit - Ligne de commande

```
Test Selection Options:

  --filter <pattern>         Filter which tests to run.
  --testsuite <pattern>      Filter which testsuite to run.
  --group ...                Only runs tests from the specified group(s).
  --exclude-group ...        Exclude tests from the specified group(s).
  --list-groups              List available test groups.
  --test-suffix ...          Only search for test in files with specified
                             suffix(es). Default: Test.php,.phpt

Configuration Options:

  --bootstrap <file>         A "bootstrap" PHP file that is run before the tests.
  -c|--configuration <file> Read configuration from XML file.
  --no-configuration         Ignore default configuration file (phpunit.xml).
  --no-coverage              Ignore code coverage configuration.
  --include-path <path(s)>  Prepend PHP's include_path with given path(s).
  -d key[=value]             Sets a php.ini value.

Miscellaneous Options:

  -h|--help                  Prints this usage information.
  --version                  Prints the version and exits.
  --atleast-version <min>   Checks that version is greater than min and exits.
```

PHPUnit - Ligne de commande

```
Test Execution Options:

  --report-useless-tests    Be strict about tests that do not test anything.
  --strict-coverage         Be strict about unintentionally covered code.
  --strict-global-state     Be strict about changes to global state
  --disallow-test-output    Be strict about output during tests.
  --disallow-resource-usage Be strict about resource usage during small tests.
  --enforce-time-limit      Enforce time limit based on test size.
  --disallow-todo-tests     Disallow @todo-annotated tests.

  --process-isolation       Run each test in a separate PHP process.
  --no-globals-backup       Do not backup and restore $GLOBALS for each test.
  --static-backup           Backup and restore static attributes for each test.

  --colors=<flag>           Use colors in output ("never", "auto" or "always").
  --columns <n>             Number of columns to use for progress output.
  --columns max             Use maximum number of columns for progress output.
  --stderr                  Write to STDERR instead of STDOUT.
  --stop-on-error           Stop execution upon first error.
  --stop-on-failure         Stop execution upon first error or failure.
  --stop-on-warning         Stop execution upon first warning.
  --stop-on-risky           Stop execution upon first risky test.
  --stop-on-skipped         Stop execution upon first skipped test.
  --stop-on-incomplete      Stop execution upon first incomplete test.
  -v|--verbose              Output more verbose information.
  --debug                   Display debugging information during test execution.

  --loader <loader>         TestSuiteLoader implementation to use.
  --repeat <times>          Runs the test(s) repeatedly.
  --tap                     Report test execution progress in TAP format.
  --teamcity                Report test execution progress in TeamCity format.
  --testdox                 Report test execution progress in TestDox format.
  --printer <printer>       TestListener implementation to use.
```

PHPUnit - phpunit.xml

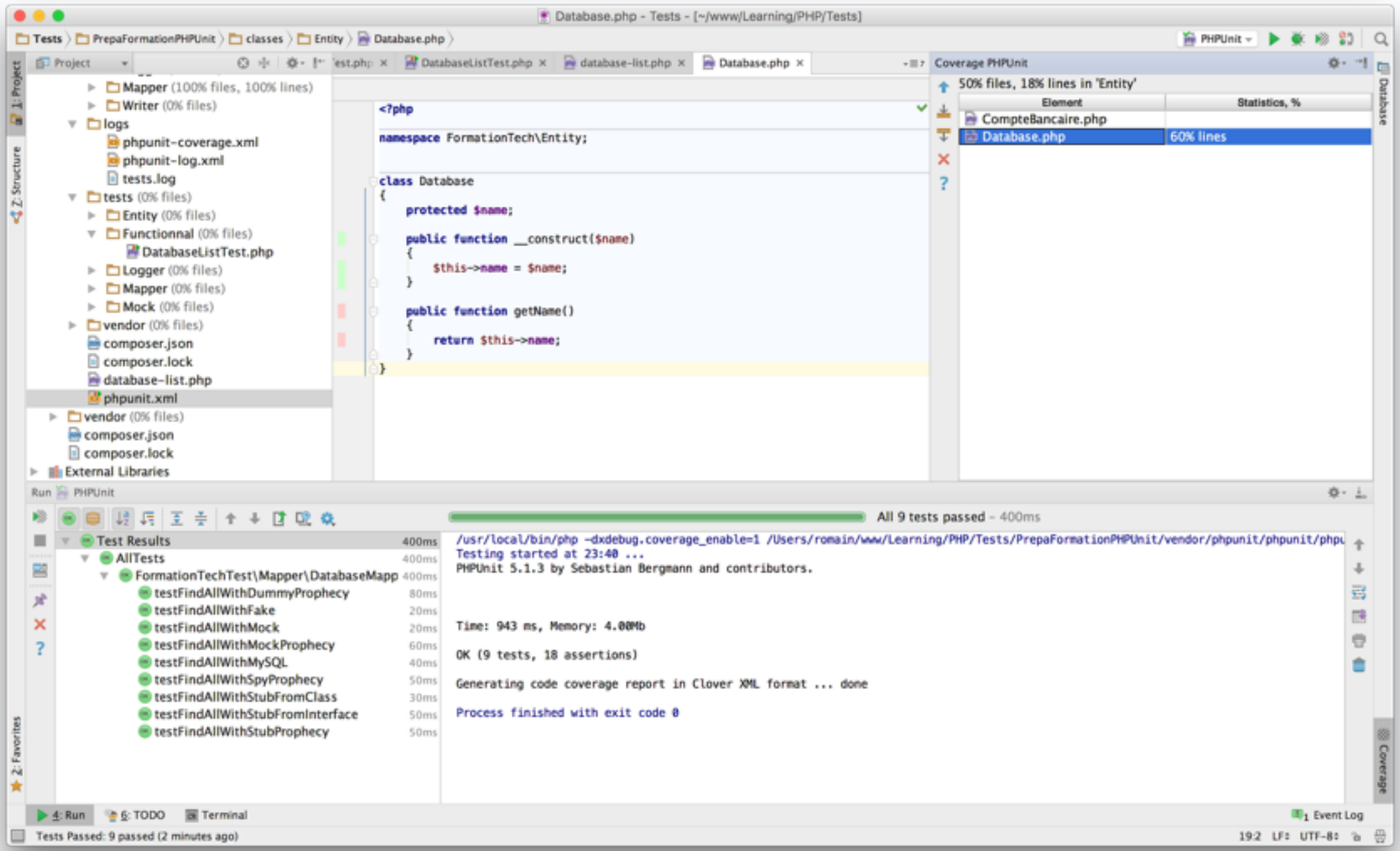
```xml
<?xml version="1.0" encoding="UTF-8"?>
<phpunit colors="true">

    <testsuites>
        <testsuite name="AllTests">
            <directory>tests/Mapper</directory>
        </testsuite>
    </testsuites>

    <filter>
        <blacklist>
            <directory suffix=".php"></directory>
            <file></file>
            <exclude>
                <directory suffix=".php"></directory>
                <file></file>
            </exclude>
        </blacklist>
        <whitelist processUncoveredFilesFromWhitelist="true">
            <directory suffix=".php">classes</directory>
            <file></file>
            <exclude>
                <directory suffix=".php"></directory>
                <file></file>
            </exclude>
        </whitelist>
    </filter>

    <logging>
        <log type="coverage-clover" target="logs/phpunit-coverage.xml"/>
        <log type="junit" target="logs/phpunit-log.xml" logIncompleteSkipped="false"/>
    </logging>

</phpunit>
```

PHPUnit - bootstrap

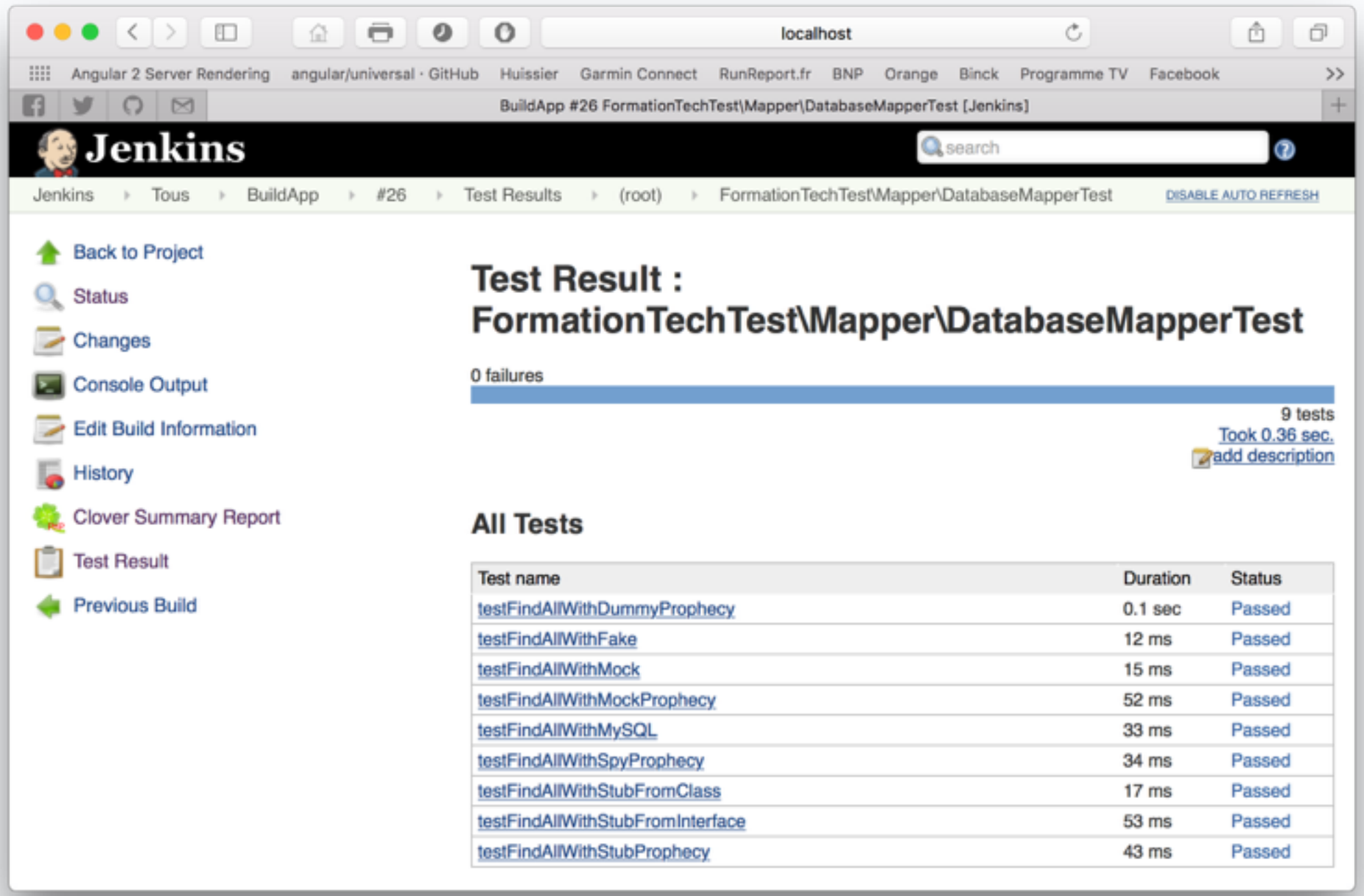
- Un fichier de bootstrap peut être exécuter au démarrage de PHPUnit
- Intérêts :
  - Autochargement de classe (sauf si phpunit a été installé avec Composer et que l'autoloader est celui de composer)
  - Modification du include_path
  - Chargement de fichiers de configuration

PHPUnit - IDE

- PHPStorm



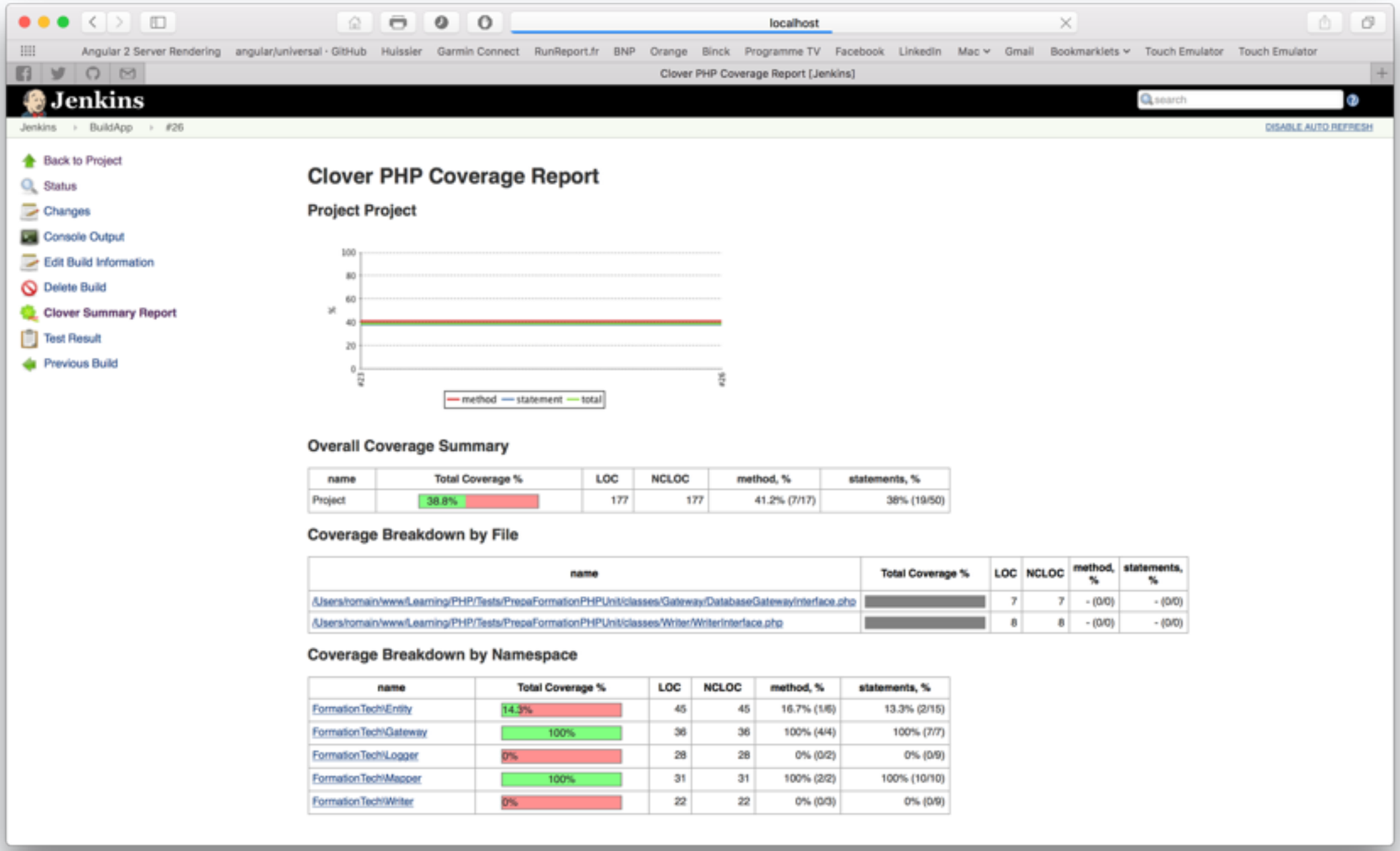
PHPUnit - Intégration continue



- JUnit Plugin

PHPUnit - Intégration continue

- Clover PHP plugin



formation.tech

Assertions

Assertions - Introduction

- Dans un framework xUnit, les assertions sont les méthodes qui vérifient qu'un résultat espéré corresponde au résultat attendu
- Le test échoue et s'arrête à la première assertion qui n'est pas vérifiée
- Bonnes pratiques :
  - Plusieurs assertions par test
  - Utiliser la méthode d'assertion la plus précise possible pour avoir un message d'erreur clair :
    Ex : `assertEmpty($tableau)`
    plutôt que `assertEquals(0, count($tableau))`
  - Si possible ajouter un message personnalisé

Assertions - Basiques

- assertContains
- assertEquals
- assertFalse
- assertGreaterThan
- assertGreaterThanOrEqual
- assertInfinite
- assertInternalType
- assertLessThan
- assertLessThanOrEqual
- assertNan
- assertRegExp
- assertSame
- assertStringEndsWith
- assertStringMatchesFormat
- assertStringStartsWith
- assertThat
- assertTrue

Assertions - Tableaux

- assertArrayHasKey
- assertArraySubset
- assertCount
- assertContains
- assertContainsOnly
- assertContainsOnlyInstancesOf
- assertEmpty

Assertions - Fichiers et Formats

- Fichiers
  - assertFileEquals
  - assertFileExists
  - assertStringEqualsFile
  - assertStringMatchesFormatFile
- XML
  - assertEqualXMLStructure
  - assertXmlFileEqualsXmlFile
  - assertXmlStringEqualsXmlFile
  - assertXmlStringEqualsXmlString
- JSON
  - assertJsonFileEqualsJsonFile
  - assertJsonStringEqualsJsonFile
  - assertJsonStringEqualsJsonString

Assertions - Classes et Objets

- assertClassHasAttribute
- assertClassHasStaticAttribute
- assertInstanceOf
- assertObjectHasAttribute
- assertNull

formation.tech

Types de tests

Types de tests - Test Unitaire

```
PrepaFormationPHPUnit
  classes
    Entity
      CompteBancaire.php
  tests
    Entity
      CompteBancaireTest.php
  vendor
  composer.json
  composer.lock
```

```php
<?php

namespace FormationTech\Entity;

class CompteBancaire
{
    protected $solde;

    public function __construct($solde = 0)
    {
        $this->solde = (double) $solde;
    }
    public function getSolde()
    {
        return $this->solde;
    }

    public function debiter($montant)
    {
        $this->solde -= (double) $montant;
    }

    public function crediter($montant)
    {
        $this->solde += (double) $montant;
    }
}
```

```php
<?php

namespace FormationTechTest\Entity;

use FormationTech\Entity\CompteBancaire;

class CompteBancaireTest extends
\PHPUnit_Framework_TestCase
{
    public function testCrediter()
    {
        $compte = new CompteBancaire(0);
        $compte->crediter(1000);
        $this->assertEquals(1000, $compte->getSolde());

        $compte->crediter(500);
        $this->assertEquals(1500, $compte->getSolde());
    }
}
```

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit tests/Entity/CompteBancaireTest.php --colors
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

.                                                                   1 / 1 (100%)

Time: 39 ms, Memory: 1.50Mb

OK (1 test, 2 assertions)
```

Types de tests - Test d’intégration

```php
<?php

namespace FormationTech\Logger;

use FormationTech\Writer\WriterInterface;
use Psr\Log\LoggerInterface;
use Psr\Log\LoggerTrait;

class Logger implements LoggerInterface
{
    use LoggerTrait;

    protected $writer;

    public function __construct(WriterInterface $writer)
    {
        $this->writer = $writer;
    }

    public function log($level, $message, array $context = array())
    {
        $datetime = date('Y-m-d H:i:s');
        $logMessage = "[$level] - $datetime - $message";

        $this->writer->write($logMessage);
    }
}
```

```php
<?php

namespace FormationTech\Writer;

class FileWriter implements WriterInterface
{
    protected $fic;

    public function __construct($filePath)
    {
        $this->fic = fopen($filePath, 'a');
    }

    public function write($message)
    {
        fwrite($this->fic, "$message\n");
    }

    public function __destruct()
    {
        fclose($this->fic);
    }
}
```

- Exemple de communication entre 2 classes :
  - Logger dépend de Writer (WriterInterface) et est compatible PSR-4
  - FileWriter implémente WriterInterface et sa méthode write

Types de tests - Test d’intégration

```php
<?php

namespace FormationTechTest\Logger;

use FormationTech\Logger\Logger;
use FormationTech\Writer\FileWriter;
use Psr\Log\LogLevel;

class LoggerTest extends \PHPUnit_Framework_TestCase
{
    public function testLogWithFileWriter()
    {
        $testFile = __DIR__ . '/../../tests.log';
        $fw = new FileWriter($testFile);
        $logger = new Logger($fw);

        $logger->log(LogLevel::NOTICE, 'Un message');
        $content = file_get_contents($testFile);

        $this->assertRegExp('/\[notice\] - \d{4}-\d{2}-\d{2} \d{2}:\d{2}:\d{2} - Un message\n/',
$content);
    }
}
```

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit tests/Logger/LoggerTest.php --colors
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

.                                                                   1 / 1 (100%)

Time: 38 ms, Memory: 1.50Mb

OK (1 test, 1 assertion)
```

Types de tests - Test fonctionnel

```php
<?php
require_once __DIR__ . '/vendor/autoload.php';

$pdo = new \PDO('mysql:host=localhost', 'root', '');
$gateway = new \FormationTech\Gateway\DatabaseGateway($pdo);
$dbList = $gateway->listDbs();
?>
<!DOCTYPE html>
<html>
    <head>
        <meta charset="UTF-8">
        <title>Database list</title>
    </head>
    <body>
        <h2>Database list</h2>
        <ul>
            <?php foreach ($dbList as $db) : ?>
            <li><?=htmlspecialchars($db)?></li>
            <?php endforeach; ?>
        </ul>
    </body>
</html>
```

- Démarrage du PHP Built-in Server

  `php -S localhost:8080`

Types de tests - Test fonctionnel

```php
<?php

namespace FormationTechTest\Functionnal;

use Goutte\Client;

class DatabaseListTest extends \PHPUnit_Framework_TestCase
{
    public function testListDbs()
    {
        $client = new Client();
        $crawler = $client->request('GET', 'http://localhost:8080/database-list.php');

        $this->assertEquals(200, $client->getResponse()->getStatus());
        $this->assertEquals('Database list', $crawler->filter('h2')->text());
        $this->assertCount(13, $crawler->filter('ul > li'));
    }
}
```

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit tests/Logger/LoggerTest.php --colors
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

.                                                                   1 / 1 (100%)

Time: 38 ms, Memory: 1.50Mb

OK (1 test, 1 assertion)
```

formation.tech

Doubles

Double - Introduction

- Le code PHP fait souvent appel à des composants externes :
  - Accès aux entrées/sorties
  - Accès à une base de données
  - Accès à un Service Web
- Certaines classes ne peuvent être testées de manières unitaires car elles dépendent d’autres classes.
- Solutions : les Doubles

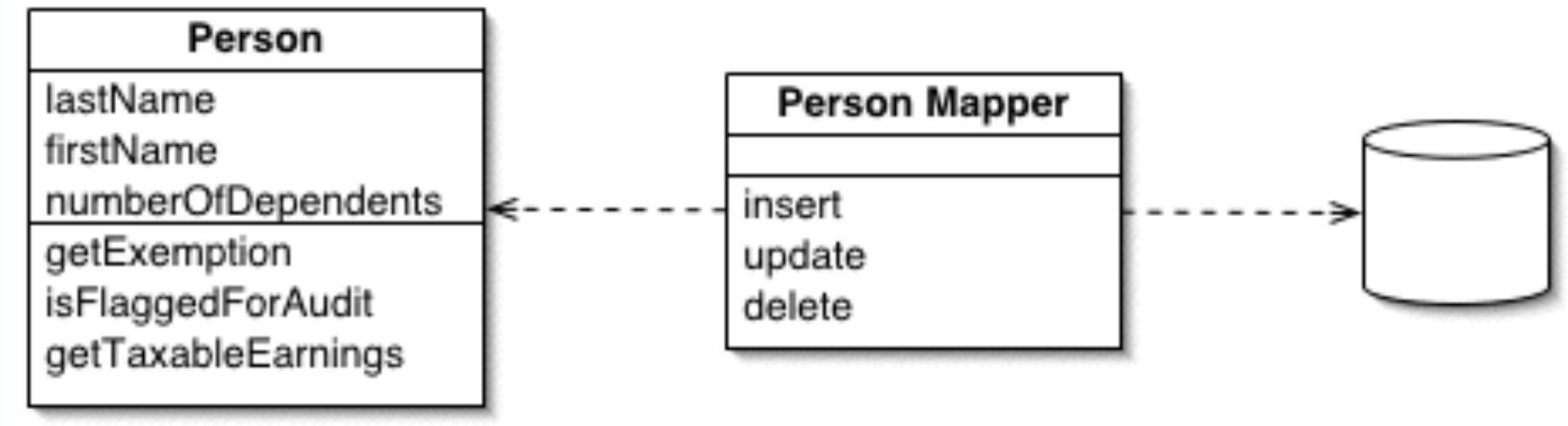
  Objets ou fonctions qui ressemblent et se comportent comme le composant qu’ils imitent, mais qui sont en réalité des versions simplifiée qui permettent de faciliter l’écriture du test.

Double - Introduction

- 5 types de Doubles :
  - Fake (une classe créée par l'utilisateur qui fera les opérations ne mémoire)
  - Dummy (une classe générée dont les méthodes ne font rien)
  - Stub (une classe générée dont les méthodes ont le même comportement)
  - Mock (Stub + vérification que les méthodes soient bien appelée)
  - Spy (Dummy + vérification que les méthodes soient bien appelée à postériori)
- Bonnes pratiques :
  - Injection de Dépendance (pas de composition)
  - Registre ou Container d'injection de Dépendance

Double - Classes d’exemple

- Un DataMapper
  http://martinfowler.com/eaaCatalog/dataMapper.html



Double - Classes d’exemple

- Entité

```php
<?php

namespace FormationTech\Entity;

class Database
{
    protected $name;

    public function __construct($name)
    {
        $this->name = $name;
    }

    public function getName()
    {
        return $this->name;
    }
}
```

Double - Classes d’exemple

- Gateway

```php
<?php

namespace FormationTech\Gateway;

class DatabaseGateway implements DatabaseGatewayInterface
{
    protected $pdo;

    public function __construct($pdo)
    {
        $this->pdo = $pdo;
    }

    public function listDbs()
    {
        $stmt = $this->pdo->query('SHOW DATABASES');

        return $stmt->fetchAll(\PDO::FETCH_COLUMN);
    }
}
```

```php
<?php

namespace FormationTech\Gateway;

interface DatabaseGatewayInterface
{
    public function listDbs();
}
```

Double - Classes d’exemple

- Mapper (classe à tester unitairement)

```php
<?php

namespace FormationTech\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGatewayInterface;

class DatabaseMapper
{
    protected $gateway;

    public function __construct(DatabaseGatewayInterface $gateway)
    {
        $this->gateway = $gateway;
    }

    public function findAll()
    {
        $dbsArray = $this->gateway->listDbs();
        $dbsObj = [];

        if (!$dbsArray) {
            return $dbsObj;
        }

        foreach ($dbsArray as $dbName) {
            $dbsObj[] = new Database($dbName);
        }

        return $dbsObj;
    }
}
```

Double - Sans Double

- Test sans double

```php
<?php

namespace FormationTechTest\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGateway;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{
   public function testFindAllWithMySQL()
    {
        $pdo = new \PDO('mysql:host=localhost', 'root', '');
        $gateway = new DatabaseGateway($pdo);
        $mapper = new DatabaseMapper($gateway);

        $dbs = $mapper->findAll();

        $this->assertCount(13, $dbs);
        $this->assertContainsOnlyInstancesOf(Database::class, $dbs);
    }
}
```

- Problème : changement dans la base de données ?
- Solution : fixture dans un setUp ? double ?

Double - Fake

- Fake

```php
<?php

namespace FormationTech\Gateway;

class DatabaseGatewayFake implements DatabaseGatewayInterface
{
    protected $dbs;

    public function __construct(Array $dbs)
    {
        $this->dbs = $dbs;
    }

    public function listDbs()
    {
        return $this->dbs;
    }
}
```

```php
<?php

namespace FormationTechTest\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGatewayFake;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{
    public function testFindAllWithFake()
    {
        $gateway = new DatabaseGatewayFake(['db1', 'db2', 'db3']);
        $mapper = new DatabaseMapper($gateway);

        $dbs = $mapper->findAll();

        $this->assertCount(3, $dbs);
        $this->assertContainsOnlyInstancesOf(Database::class, $dbs);
    }
}
```

Double - Prophecy

```php
<?php

namespace FormationTechTest\Mock;

use FormationTech\Mapper\DatabaseMapper;

class MockTest extends \PHPUnit_Framework_TestCase
{
    public function testMockSingleton()
    {
        $mock1 = $this->getMockBuilder(DatabaseMapper::class)->disableOriginalConstructor()->getMock();
        $mock2 = $this->getMockBuilder(DatabaseMapper::class)->disableOriginalConstructor()->getMock();

        $mock1->method('findAll')->willReturn('val1');
        $mock2->method('findAll')->willReturn('val2');

        $this->assertEquals('val1', $mock1->findAll());
        $this->assertEquals('val2', $mock1->findAll());
    }
}
```

```
MBP-de-Romain:PrepaFormationPHPUnit romain$ ./vendor/bin/phpunit tests/Mock/MockTest.php --colors
PHPUnit 5.1.3 by Sebastian Bergmann and contributors.

F                                                                   1 / 1 (100%)

Time: 98 ms, Memory: 1.75Mb

There was 1 failure:

1) FormationTechTest\Mock\MockTest::testMockSingleton
Failed asserting that two strings are equal.
--- Expected
+++ Actual
@@ @@
-'val2'
+'val1'

/Users/romain/www/Learning/PHP/Tests/PrepaFormationPHPUnit/tests/Mock/MockTest.php:19

FAILURES!
Tests: 1, Assertions: 2, Failures: 1.
```

Double - Prophecy

- Sebastian Bergman à propos de l'API de Mock de PHPUnit : https://thephp.cc/news/2015/02/phpunit-4-5-and-prophecy

- L'ancien API continue d'exister pour rester compatible avec les anciens tests

- PHPUnit depuis la version 4.5 intègre un framework de test moderne : Prophecy

- Documentation https://github.com/phpspec/prophecy

Double - Prophecy Dummy

```php
<?php

namespace FormationTechTest\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGateway;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{

    // ...

    public function testFindAllWithDummyProphecy()
    {
        $dummy = $this->prophesize(DatabaseGateway::class);

        $mapper = new DatabaseMapper($dummy->reveal());

        $dbs = $mapper->findAll();

        $this->assertEmpty($dbs);
    }

    // ...

}
```

Double - Prophecy Stub

```php
<?php

namespace FormationTechTest\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGateway;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{

    // ...

    public function testFindAllWithStubProphecy()
    {
        $stub = $this->prophesize(DatabaseGateway::class);

        $stub->listDbs()->willReturn(['db1', 'db2', 'db3', 'db4']);

        $mapper = new DatabaseMapper($stub->reveal());

        $dbs = $mapper->findAll();

        $this->assertCount(4, $dbs);
        $this->assertContainsOnlyInstancesOf(Database::class, $dbs);
    }

    // ...

}
```

Double - Prophecy Mock

```php
<?php

namespace FormationTechTest\Mapper;

use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGateway;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{

    // ...

    public function testFindAllWithMockProphecy()
    {
        $mock = $this->prophesize(DatabaseGateway::class);

        $mock->listDbs()->willReturn(['db1', 'db2'])->shouldBeCalledTimes(1);

        $mapper = new DatabaseMapper($mock->reveal());

        $dbs = $mapper->findAll();

        $this->assertCount(2, $dbs);
        $this->assertContainsOnlyInstancesOf(Database::class, $dbs);
    }

    // ...

}
```

Double - Prophecy Spy

```php
<?php

namespace FormationTechTest\Mapper;


use FormationTech\Entity\Database;
use FormationTech\Gateway\DatabaseGateway;
use FormationTech\Mapper\DatabaseMapper;

class DatabaseMapperTest extends \PHPUnit_Framework_TestCase
{

    // ...

    public function testFindAllWithSpyProphecy()
    {
        $mock = $this->prophesize(DatabaseGateway::class);

        $mapper = new DatabaseMapper($mock->reveal());

        $dbs = $mapper->findAll();

        $this->assertEmpty($dbs);

        $mock->listDbs()->shouldHaveBeenCalledTimes(1);
    }

    // ...

}
```

Double - Autres frameworks

- Mockery
  https://github.com/padraic/mockery
  http://docs.mockery.io/en/latest/

- Phake
  https://github.com/mlively/Phake
  http://phake.readthedocs.org/en/2.1/

Zend Framework 2

Zend Framework 2 - Introduction

- Zend\Test
  - Apparu dans Zend Framework 2.1
  - Simplifie l'écriture des tests des contrôleurs
  - Ajoute des assertions
- 2 classes pour tester les contrôleurs Web ou Console
  - Zend\Test\PHPUnit\Controller\AbstractHttpControllerTestCase
  - Zend\Test\PHPUnit\Controller\AbstractConsoleControllerTestCase

Zend Framework 2 - Assertions

- Requêtes
  - assertModulesLoaded(array $modules)
  - assertModuleName($module)
  - assertControllerName($controller)
  - assertControllerClass($controller)
  - assertActionName($action)
  - assertMatchedRouteName($route)

Zend Framework 2 - Assertions

- CSS Selector
  - assertQuery($path)
  - assertQueryContentContains($path, $match)
  - assertQueryContentRegex($path, $pattern)
  - assertQueryCount($path, $count)
  - assertQueryCountMin($path, $count)
  - assertQueryCountMax($path, $count)

Zend Framework 2 - Assertions

- XPath
  - assertXpathQuery($path)
  - assertNotXpathQuery($path)
  - assertXpathQueryCount($path, $count)
  - assertNotXpathQueryCount($path, $count)
  - assertXpathQueryCountMin($path, $count)
  - assertXpathQueryCountMax($path, $count)
  - assertXpathQueryContentContains($path, $match)
  - assertNotXpathQueryContentContains($path, $match)
  - assertXpathQueryContentRegex($path, $pattern)
  - assertNotXpathQueryContentRegex($path, $pattern)

Zend Framework 2 - Assertions

- Redirect
  - assertRedirect()
  - assertRedirectTo($url)
  - assertRedirectRegex($pattern)
- Response Header
  - assertResponseStatusCode($code)
  - assertResponseHeader($header)
  - assertResponseHeaderContains($header, $match)
  - assertResponseHeaderRegex($header, $pattern)

Zend Framework 2 - Test Fonctionnel

```php
class AlbumControllerTest extends AbstractHttpControllerTestCase
{

    public function testListActionContainsName()
    {
        $repositoryMock = $this->getMockBuilder('AddressBook\Entity\Repository\ContactRepository')
            ->disableOriginalConstructor()
            ->getMock();

        $entityMock = $this->getMockBuilder('AddressBook\Entity\Contact')
            ->getMock();

        $entityMock->expects($this->any())
            ->method('getId')
            ->will($this->returnValue(1));

        $entityMock->expects($this->any())
            ->method('getPrenom')
            ->will($this->returnValue("Romain"));

        $entityMock->expects($this->any())
            ->method('getNom')
            ->will($this->returnValue("Bohdanowicz"));

        $repositoryMock->expects($this->once())
            ->method('findBy')
            ->will($this->returnValue(array($entityMock)));

        $serviceManager = $this->getApplicationServiceLocator();
        $serviceManager->setAllowOverride(true);
        $serviceManager->setService('AddressBook\Entity\Repository\ContactRepository', $repositoryMock);

        $this->dispatch('/');
        $this->assertQueryContentContains('tr td', 'Romain Bohdanowicz');
    }
}
```